

ORGANIC CHEMISTRY LABORATORY

Chemistry 311 Fall 2021

Coordinator and Lecturer: Dr. G. Govindarajoo (ggovinda@chem.rutgers.edu)

Lecture on Zoom: Tues 9:00-9:55 am (for Sections 1-9, 17, 19, 21-26)
 Wed 9:00-9:55 am (for Sections 10, 12, 13, 15)

NOTE: Students should attend the lecture that they are registered for.

PREREQUISITES

Chemistry 307 (or equivalent first semester Organic Chemistry lecture course) and Chemistry 171 (or equivalent General Chemistry Laboratory course). Students who have not satisfied these prerequisites will not receive credit for this course even if they are enrolled.

COURSE OBJECTIVES

This course is designed to introduce the theory and practice of analytical and purification techniques commonly used in Organic Chemistry. These techniques will be used in the synthesis experiments carried out in the latter part of the course. Applications of some of these techniques in biological settings will also be briefly discussed. Students will be expected to write accurate, cohesive and comprehensible laboratory reports of their experiments. The goal of the course is for students to be able to analyze data obtained from their observations in the experiments they perform (or view in the case of remote instruction), form reasonable conclusions and relate the reactions and reaction mechanisms from the Organic Chemistry lecture course to support their analysis and conclusions.

REQUIRED COURSE MATERIALS

1) The textbook package for the course is "Macroscale & Microscale Organic Experiments by Williamson (7th ed)". This is available through the **First Day Course Materials** link on the course Canvas website. You should have received an email from the Barnes and Noble bookstore but if not, the information will also be on Canvas under the "Welcome to Chemistry 311" module.

2) Safety goggles: To protect your eyes in the laboratory (must be face-fitting and form seal around eyes; ordinary glasses or other types of safety glasses are not acceptable). See Laboratory Safety Rules in this syllabus regarding contact lens policy. These can be purchased from the bookstore or on an online site. An example of the kind of goggles you need is:

https://www.amazon.com/Protective-Wide-Vision-Adjustable-Protection-Lightweight/dp/B07VF3C2CW/ref=sr_1_1_sspa?dchild=1&keywords=safety+goggles&qid=1629485495&sr=8-1-spons&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEExWkpOM1pONkhLWUI4JmVuY3J5cHRlZEIkPUEwMTMwMTUyVFJTTlgyWDZFT0g3JmVuY3J5cHRlZEFkSWQ9QTA3MDYwMDAzTkWzT0xKN1ZEODBDJndpZGdlE5hbWU9c3BfYXRmJmFjdGlvbj1jbGlja1JlZGlyZWNOJmRvTm90TG9nQ2xpY2s9dHJlZQ==

4) A mask for the in-person lab sessions – please see below for University Mask Requirement:

In order to protect the health and well-being of all members of the University community, masks must be worn by all persons on campus when in the presence of others (within six feet) and in buildings in non-private enclosed settings (e.g., common workspaces, workstations, meeting rooms, classrooms, etc.). Masks must be worn during class meetings; any student not wearing a mask will be asked to leave.

Masks should conform to CDC guidelines and should completely cover the nose and mouth:

<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html>

Each day before you arrive on campus or leave your residence hall, you must complete the brief survey on the [My Campus Pass symptom checker](#) self-screening app.

- 4) Rubber gloves: To protect your hands while handling chemicals. These are the kind of dishwashing gloves used for cleaning around the house (available in any grocery or drug store).
- 5) High-speed internet, printer and scanner (or scanning app so that documents can be converted into pdf format for uploading), webcam.
- 6) A Rutgers Zoom Account. **Only students with Rutgers Zoom Accounts will be authorized to join the synchronous instruction and lab sections during the semester.**
- 7) A mobile device to take certain pictures during your lab experiment to submit with the lab report.
- 8) Recommended: Software to draw chemical structures to insert into lab reports.
Examples:
 - a) ChemDraw software – available for free for Rutgers students. Go to software.rutgers.edu, login with NetID and password, click on “Chemistry” under Software Category and click on ChemDrawPro 19.1 and follow instructions to download. Needed for structures and mechanisms for later lab reports.
 - b) Molview – open source web application

WHAT YOU NEED FOR FIRST WEEK OF IN-PERSON LAB

Items 1-4,7 as shown above with **your prelab completed for first week’s experiment and submitted on Canvas by the deadline, OWLv2 Assignment 1 and 2 completed and submitted, Playposit 1 and 2 completed and submitted, having watched the lecture and experiment videos as well as studying procedures BEFORE the beginning of the lab period.** (see instructions under Guidelines for Writing Lab Reports)

WHAT YOU NEED FOR SECOND WEEK OF IN-PERSON LAB

Items 1-4, 7 with **your completed postlab of first week’s experiment submitted on Canvas, your completed prelab for second week’s experiment submitted on Canvas AND OWLv2 Assignment 3 completed and submitted, Playposit 3 completed and submitted at least 1 hour BEFORE the beginning of lab period. You will need to watch the lecture and experiment videos as well as study the procedures BEFORE the beginning of the lab period.**

WHAT YOU NEED FOR SUBSEQUENT WEEKS OF IN-PERSON LAB

Items 1-4, 7 with **your completed postlab of the previous week’s experiment submitted on Canvas, your completed prelab for second week’s experiment submitted on Canvas AND OWLv2 assignment (if assigned for that week), the affiliated Playposit completed and submitted at least 1 hour BEFORE the beginning of lab period. You will need to watch the lecture and experiment videos as well as study the procedures BEFORE the beginning of the lab period.**

COURSE POLICIES

1. **Laboratory Safety** All persons in the lab must observe the safety rules. Non-compliance with safety rules will result in expulsion from the lab and no make-up will be allowed and the absence will be considered unexcused. The requirement for appropriate attire, goggles and mask (please see item 3 above for Rutgers requirement for masking) must be adhered to.

2. **Promptness:** In-person laboratory sessions will begin and end promptly as scheduled; students will not be allowed to work overtime or during off-hours. If a student arrives late to lab, he or she cannot stay longer than the latest student who came on time.

3. **Lectures:** Due to the lectures being remote, most of the material for lecture will be posted as a video. It is imperative that the lecture videos are watched ahead of attending the lab it discusses. An outline will be provided for each lecture for you to take notes on from the videos you watch. These lecture videos will also be a part of the Playposit quizzes that you will have to complete by a deadline. Much of the quiz and exam material as well as what is required in the lab report will be provided during the lecture for the course in conjunction with the textbook. Lab instructors will assume that students have watched the lecture videos and will not provide information that has already been provided in the lecture.

Synchronous instruction during lecture begins Tuesday 9/14/21 and Wednesday 9/15/21 for the sections associated with the specific lecture periods. Starting Tuesday 9/21/21 and Wednesday 9/22/21, the lecture period will be used for the weekly quizzes (see Quiz during Lecture Schedule) followed by some synchronous lecture work.

4. **Make-up for in person labs:** The labs this semester are extremely full. As such, there are very few spaces open for make-ups. A missed lab period may be made up only for valid medical reason (with a doctor's note as documentation), a religious holiday (with valid documentation from the student's religious leader), valid school activities (with valid documentation) and/or with a note from the dean's office. The student is responsible for contacting Dr. Govindarajoo **immediately with your detailed schedule for the remainder of the lab week** to find an open spot in other lab sections. The lab must be made up before the last date of the experiment listed under "Experiment Schedule". **Under no circumstances will a make-up lab be permitted once the last date for that experiment has passed.** **NOTE: You are not permitted to just show up in another lab period to make up the lab without prior authorization from Dr. Govindarajoo.**

You should still contact Dr. Govindarajoo immediately if you cannot find a time for a make up lab because last minute absences in some sections may clear a spot for you to make up your lab. You may be also presented with alternate options to complete a lab report so make sure you contact Dr. Govindarajoo immediately if you have to miss a lab for a valid reason.

If you fail to attend the make up lab session that was agreed upon by you and Dr. Govindarajoo, the absence would be considered unexcused UNLESS Dr. Govindarajoo was informed of a timely manner that a valid reason (with documentation) caused you to miss your make up lab. Missing a make up lab without a valid documentable reason that Dr. Govindarajoo was not informed about beforehand may also carry additional penalties.

Absences: For an absence to be excused, Dr. Govindarajoo **must** be contacted immediately in case there is a chance for the lab to be made up. Valid documentation **MUST** be provided **within a week of the absence** to your lab instructor **and** Dr. Govindarajoo. **ADDITIONALLY**, you must use the University absence reporting website <https://sims.rutgers.edu/ssra/> <<https://sims.rutgers.edu/ssra/>> also within a week of the absence to indicate the date and reason for your absence. If any of the above steps are not followed, the absence will not be excused. It is highly advised that you contact Dr. Govindarajoo immediately after an absence even if you are not sure if the absence can be excused to

see what your options are. **NOTE: A student with 3 or more absences in the in-person (valid or otherwise) will not pass the course.**

Vacation plans are NOT valid reasons for lab make-up or absences. MCAT/DAT/OAT and similar exams are NOT valid reasons for lab make-up or absences.

Religious holidays and valid school activities: Students have to contact Dr. Govindarajoo about potential absences for any part of this course due to religious holidays and valid school activities (sports meet etc) **by 9/7/21** so that make-ups can be arranged. Students are then responsible for e-mailing Dr. Govindarajoo with their detailed schedule for the week of the potential absence **two weeks from the potential absence** to receive instructions on a makeup or alternate arrangements. Valid documentation (letter from religious leader/faculty advisor/coach) **MUST** be provided for these potential absences by 9/7/21.

Students are responsible for all the material from a missed lab and will be tested on it in quizzes and exam.

5. **Missed quizzes on Canvas:** Contact Dr. Govindarajoo immediately in case you miss the quiz on Canvas for any reason. If the reason is valid, arrangements will be made for you to make up the quiz as close to the original time of the quiz as possible.

6. **Laboratory Reports** and format for submitting them on Canvas will be discussed in the posting “Guidelines for Writing Lab Reports”. Submitting late or incomplete laboratory reports and/or failure to submit lab reports will result in deduction of lab report points which may very possibly lead to the earning of an unsatisfactory/ failing grade in the course. No lab report will be accepted 2 weeks past the due date of the lab report. **Please note that the Academic Honesty clause applies to the lab reports and all other assignments/quizzes/exam for the course.**

7. **Online OWLv2 assignments** for Experiments 1-5 and 7 must be completed by the deadline **determined by your section time** (deadline is an hour prior to your scheduled lab time). You will be accessing the OWLv2 website via Canvas. It is advised that you actually study the entire assignment instead of just answering the questions since some quiz/exam questions will be taken from these assignments.

8. **Exam** will be given on the specified dates during lecture period. The material for the exams will come from your lab experiments, readings and lecture material. Since the exam is during the lecture period, students **CANNOT** have a conflict with the exam. Students **MUST** take the exam in the lab lecture session associated with their lab section. You will **NOT** be able to postpone/take the exam on a different date just because you have other exams that same week – you have plenty of notice and the review sheet is posted weeks ahead of time. Please plan accordingly. Earning a score of less than 30% on the written exam may very possibly lead to the earning of an unsatisfactory/ failing grade in the course. **NOTE:** If you end up falling ill on the day of the exam, you have to make the decision if you take the exam or not. If you decide not to take it, please get a doctor’s or dean’s note to excuse you for that absence. If you do decide to take the exam even though you are ill, then you would need to be prepared to accept the consequences of the score you earn if you end up with a low score. We cannot disregard the score after the fact just because you took the exam while you were ill. **Please note that the Academic Honesty clause applies to the exam and all other assignments/quizzes for the course.**

9. **Quizzes** A short quiz will be administered during the start of your lecture period starting on Tuesday 9/14/21 (for Sections 1-9, 17, 19, 21-26) and Wednesday 9/15/21 (for Sections 10, 12, 13, 15) and follow

suit in subsequent weeks. The material for the quizzes has been listed in the “**Quiz During Lecture Schedule**”. A safety quiz will be assigned on Canvas on the first week of lab and will be due ONE HOUR prior to your **2nd in-person lab period** . **Please note that the Academic Honesty clause applies to the quizzes and all other assignments/lab reports/exam for the course.**

10. **Preparation** Adequate preparation before lab period will reduce frustration and increase understanding and facilitate learning for the course.

11. **Library Research Project:** A short assignment involving the use of library resources, citing references in proper form and researching techniques discussed in the course. More detailed instructions and information will be provided closer to the time of this assignment.

12. **Laboratory Safety** Although you are not physically in the laboratory, you will still be responsible for knowing all the safety rules that would need to be observed in lab.

13. **Exams that Conflict With Lab:** Your laboratory period is a scheduled class. If you have a group exam that conflicts with your lab, **your lab takes priority**. You will have to make arrangements with the professor of the class with the group exam to take a conflict exam. Make-ups for lab will not be approved for this situation.

14. **Students with Disabilities:** If you have a disability, you are urged to speak to Dr. Govindarajoo **by 9/7/21** to make the necessary arrangements to support a successful learning experience. Also, you must arrange for Dr. Govindarajoo to receive a letter from your College's Disability Concerns Coordinator verifying that you have a disability by 9/7/21 as well. The student must contact the Office of Disability Services to determine his/her Coordinator (848-445-6800 or dsoffice@echo.rutgers.edu).

15. **Academic honesty** You are being graded on the work you perform. Use of lab reports/quizzes/library assignment/any other graded course material from other students (past or present) is expressly forbidden. **Both the lender and the borrower are subject to severe penalties.** Some discussion about the labs is acceptable at the discretion of the lab instructor, but you must perform all the work (including the data analysis and answering of questions) yourself. **A lab report is NOT a collaborative effort** –it must be written in your own words using your own data (in this case, data provided to you specifically. Data is randomized so different students receive different data). If you are confused, please ask for help. Don't just copy an answer. **Do not make up data or use someone else's data.** Academic honesty also applies to all quizzes, exams, library assignments and other submitted materials in this course.

The Rutgers honor pledge will be included on all (major) assessments for you to sign: *On my honor, I have neither received nor given any unauthorized assistance on this examination/quiz/ assignment.*

Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy. As per the policy, all suspected violations will be reported to the Office of Student Conduct. Academic dishonesty includes (but is not limited to):

- Cheating
- Plagiarism
- Aiding others in committing a violation or allowing others to use your work
- Failure to cite sources correctly
- Fabrication

- Using another person's ideas or words without attribution—re-using a previous assignment
- Unauthorized collaboration
- Sabotaging another student's work. When in doubt, please consult the instructor

Use of external website resources such as Chegg.com or others to obtain solutions to assignments, quizzes, or exams is cheating and a violation of the University Academic Integrity policy. Cheating in the course may result in grade penalties, disciplinary sanctions or educational sanctions.

Posting assignments, quizzes or exams, to external sites without the instructor's permission may be a violation of copyright and may constitute the facilitation of dishonesty, which may result in the same penalties as plain cheating.

Almost all original work is the intellectual property of its authors. These works may include syllabi, lecture slides, recorded lectures, homework problems, exams, and other materials, in either printed or electronic form. The authors may hold copyrights in these works, which are protected by U.S. statutes. Copying this work or posting it online without the permission of the author may violate the author's rights. More importantly, these works are the product of the author's efforts; respect for these efforts and for the author's intellectual property rights is an important value that members of the university community take seriously.

16. Chain of Communication: Please contact your lab instructor as your first point of contact for questions. Your lab instructor will triage the questions and decide if a matter needs to be addressed by Dr. Govindarajoo.

17. Chain of Command: If you have a question about grading, you should first talk about it with your lab instructor - **any questions about a score of a particular quiz or lab report MUST be addressed within a week of receiving back the quiz or lab report.** If you are not satisfied with the explanation, you may raise the question with Dr. Govindarajoo. If you have a question about content, concepts or procedures then you may ask any lab instructors or the coordinator for help. Use our office hours.

18. Students with Medical Conditions: Some medical conditions such as pregnancy, asthma, allergies to certain chemicals, or other conditions may be affected by exposure to chemicals. If you believe you are pregnant or if you have a medical problem which might be affected by chemicals, please contact Dr. Govindarajoo before the lab commences or as soon as you become aware of such a condition. We will fully respect your privacy and you do not need to disclose the nature of your medical condition to us. It is, however, imperative that your physician be informed of any chemicals you may be in contact with during the semester so that he/she can determine whether it is safe for you to participate in lab assignments. We will provide you with information for your physician regarding any substances you may be exposed to. We simply require that you bring in a note from your physician indicating that they have reviewed this information and whether you may safely proceed with laboratory work. Rutgers Environmental Health and Safety (REHS) is available to assist you if your doctor recommends that you avoid or minimize contact with certain chemicals. Please feel free to contact them at (848)445-2550 to request assistance.

19. Lost Items: Items that are left behind in laboratories will be turned over to the stockrooms of the respective locations. Items will only be held for about a week.

20. **Website:** We will be using Canvas (URL: canvas.rutgers.edu) as a classroom management system. You should check this site regularly. If you check it now, you will find a number of documents posted. If you are registered in the course and a Rutgers Student, you will automatically be a “member” of the online class. Under each week’s module, which you should go to every week to prepare for your lab, you will find Extra Notes for a particular experiment, prelab and postlab question assignments, and other relevant material. The lecture outline for the next lecture would be posted as well.

21. **Netiquette, Etiquette and Common Courtesy:**

Be Respectful - Be very mindful that all your communication with the course instructor, lab instructor and fellow classmates is respectful and does not border on being disrespectful, discourteous, inappropriate or abusive. If you encounter any disrespectful behavior from your fellow course participants, please let Dr. Govindarajoo know. We all understand that remote learning is unusual and can cause undue stress but please understand that all of us are dealing with this situation.

Allow for time for responses to queries – Please understand that the course instructor and lab instructors have many other responsibilities and the standard time to wait for a response is a **full business day**. Most times you will receive a response much sooner but please be aware of this standard.

Be Professional - Coursework is more than learning facts; it is a professional activity. Your conduct in this course should reflect this. Your communication should follow standard rules for grammar and spelling (unless in an online chat) and be clear, concise, courteous, and to the point.

GRADING

1.	Laboratory Reports (Expt 1-5, 7 that have OWLv2 prelab questions - 6 x 23 points)	138 points
2.	Laboratory Reports with written prelab questions - (3 x 28 points)	84 points
3.	In-Lab Hand Skills (7 x 7 points)	49 points
4.	OWLv2 assignments (6 x 13 points)	78 points
5.	Write up for Nucleophilic Substitution experiment	10 points
6.	Library Research Project (due date TBA)	10 points
7.	Safety Quiz	4 points
8.	Quizzes (25 points x 8)	200 points
9.	Playposit Quizzes (10 x 5 points)	50 points
10.	Comprehensive Exam	160 points
	TOTAL	783 points

Your final grade will be based on your overall percentage and number of points earned, with the final scale FOR EACH SECTION (to account for how differently each lab instructor grades) to be decided at the end of the course. An approximate idea of the grading scale would mimic the standard scale.

PLEASE NOTE: In order to earn a passing grade in the course, you cannot miss more than 2 in-person lab sessions and you cannot miss submitting more than 2 complete lab reports

A	$\geq 90\%$
B	80-89%
C	65-79%
D	55-64%
F	$\leq 55\%$

LABORATORY SAFETY RULES

There are a few precautions that you must take to avoid accidents in the lab.

1. Face-fitting goggles must be worn at all times in the laboratory. Contact lenses, even with goggles, are not permitted in the Rutgers University Organic Chemistry Laboratories. Please adhere to the masking requirement on campus.
2. Know the location of laboratory exits. Know the location and use of fire extinguishers, eye-wash fountains, safety showers, and fire blankets in the laboratory.
3. For safety reason, you must inform your lab instructor if you leave the laboratory while an experiment is being carried out. If you feel unwell or if you see lab mate unwell while carrying out an experiment, it is crucial that you inform your lab instructor.
4. Nitrile gloves are to be worn at all times when handling chemicals. They must be disposed off in the trash receptacle before leaving the laboratory and handling door handles etc.
5. Appropriate attire for performing experiments is a must and non-negotiable. Pants or skirts worn **MUST** cover the entire length of your legs (there should not be any rips or tears that expose any part of legs). Shoes **MUST** be close-toed and close backed **AND** enclose your entire foot. Tops must be at least short-sleeved. Open shoes/sandals, shorts, frilly or cumbersome clothing, bare backs or midriffs (or clothing that exposes backs and midriffs when a student reaches up or bends over), sleeveless tops, neckties, and unconfined long hair present considerable hazard in the laboratory and are **NOT PERMITTED**. Long hair should be tied back.
6. All experimental work is to be done in the hoods. Apparatus may be cleaned at regular benches.
7. Avoid breathing the vapors of volatile solvents. Some organic solvents may be toxic or carcinogenic (cancer-producing). Organic solvents should be used in the hood.
8. If the fire alarms go off, stop all experimental work and leave all chemicals and equipment in the lab. Follow instructions of lab instructor and head for an exit and assemble outside the building to the area you were instructed to go to by the lab instructor as quickly as possible.
9. Avoid contact of chemical with your skin, eyes, and clothing.
10. Handle strong acids and bases with extreme care. Strong acids and bases must remain in the allotted hoods.
11. Dispose organic waste in labeled waste containers. No waste solvents or reaction mixtures should be poured into the sinks!
12. No smoking, eating or drinking is allowed in the laboratory. Empty food/drink disposable containers **MUST** be disposed of **OUTSIDE** the laboratory before entering the laboratory.
13. Pipetting by mouth is prohibited.
14. No unauthorized experiments or other horseplay is allowed.

LABORATORY SAFETY RULES (Continued)

15. Students must be familiar with a procedure before attempting it.
16. Clean your work area, and clean dirty glassware at the end of each period.
17. Accidents must be reported at once to lab instructor and coordinator of the course
18. All spills must be cleaned up immediately by person responsible.
19. All students are responsible for knowing the safety rules and observing them. Violation may result in expulsion from laboratory.

REPORT EMERGENCIES TO THE RUTGERS UNIVERSITY POLICE AT 8-911

BASIC LABORATORY OPERATIONS

Laboratory Glassware

Since your glassware is expensive and since you are responsible for it, you will want to give proper care and respect. Needless maltreatment of your equipment may cost you money; so if you read this section carefully and follow the procedures, you may be able to avoid some unnecessary expense. Mistreating equipment can also cause lost time in the laboratory. Cleaning problems and replacing destroyed glassware are time-consuming.

Cleaning Glassware

Glassware can be cleaned more easily if it is cleaned immediately after use. With time the organic residues left in the flask will harden and stick on the surface of the flask. To remove gummy material from glassware, scrape as much as you can directly in the labeled waste container; never put organic tars, paper and other solid wastes into the sink. Next, try to remove the remaining residue by using a small amount of acetone (1-2mL). The remaining small amounts of tars and dirt can then be removed with a large test tube brush bent in such a way that it will reach the inner surfaces of the flask. The use of a little washing powder on liquid detergent followed by a good water rinse will give clean glassware when it dries.

COURSE MATERIAL SCHEDULE
Schedule of Lectures (When lecture material will be posted by)

Topic	Date Posted on Canvas	Date Discussed During Synchronous Instruction in Lecture Period via Zoom	Reading Material (pages from Textbook)
Introduction, Safety, Melting Point	9/1/21	Asynchronous Video Posted on 9/7/21	Syllabus, p. 1-18, 26-40 p. 41-55
Crystallization	9/1/21	9/14/21-9/15/21	p. 45-48, 57, 62-85
Distillation	9/7/21	9/21/21-9/22/21	p. 55-58, 87-100, 103-105, 117-120
Chromatography	9/14/21	9/28/21-9/29/21	p. 165-178, 186-191
Extraction	9/21/21	10/5/21-10/6/21	p.132-148
Nucleophilic Substitution	9/28/21	10/12/21-10/13/21	p. 320-327
Esterification, IR	10/5/21	10/19/21-10/20/21	p. 517-523, 221-233, 55-58, 87-93
Aldol Condensation	10/12/21	10/26/21-10/27/21	p. 487-489, 62-78, 84-85
Reduction	10/19/21	11/2/21-11/3/21	p. 670-671, 62-78, 84-85
Oxidation	10/26/21	11/2/21-11/3/21	p. 398-403, 62-78, 84-85, 165-178, 186-191
General Questions after Quiz		11/9/21-11/10/21	
COMPREHENSIVE EXAM ON CANVAS		Exam for Sections 1-9, 17-19, 21-26 on Tuesday 11/16/21 9:00am Exam for Sections 10, 12, 13, 15 on Wednesday 11/17/21 9:00am	

EXPERIMENT SCHEDULE

Experiment	Topic	In-Person/Virtual	Dates
1	Melting Point and Recrystallization	In-Person	9/13/21-9/17/21
2	Distillation	In-Person	9/20/21-9/24/21
3	Chromatography	In-Person	9/27/21-10/1/21
4	Extraction	In-Person	10/4/21-10/8/21
5	Nucleophilic Substitution	Virtual	10/11/21-10/15/21
6	Esterification	In-Person	10/18/21-10/22/21
7	Aldol Condensation	In-Person	10/25/21-10/29/21
8	Reduction	In-Person	11/1/21-11/5/21
9	Epoxidation	Virtual	11/8/21-11/12/21

QUIZ DURING LECTURE SCHEDULE

NOTE: Quizzes will be 20 minutes long and worth 25 points each.

Sections 1-9, 17-19, 21-26 will have quizzes on Canvas on Tuesdays (starting Tuesday 9/21/21) at 9:00am. Synchronous Instruction will begin at 9:25am on Zoom (links will be posted on Canvas) immediately after the quiz.

Sections 10, 12, 13, 15 will have quizzes on Canvas Wednesdays (starting Wednesday 9/22/21) at 9:00am. Synchronous Instruction will begin at 9:25am on Zoom (links will be posted on Canvas) immediately after the quiz.

Quiz	Dates	Topics
1	9/21/21-9/22/21	Safety, Melting Point and Recrystallization
2	9/28/21-9/29/21	Recrystallization and Distillation
3	10/5/21-10/6/21	Distillation and TLC
4	10/12/21-10/13/21	TLC and Extraction
5	10/19/21-10/20/21	Extraction and Nucleophilic Substitution
6	10/26/21-10/27/21	Nucleophilic Substitution and Esterification (and techniques discussed)
7	11/2/21-11/3/21	Esterification (and techniques discussed) and Aldol Condensation
8	11/9/21-11/10/21	Reduction and Oxidation (and techniques discussed)
COMPREHENSIVE EXAM ON CANVAS	Exam for Sections 1-9, 17-19, 21-26 on Tuesday 11/16/21 9:00am Exam for Sections 10, 12, 13, 15 on Wednesday 11/17/21 9:00am	